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June 16, 2011

Ms. Harriet Beale
Municipal Stormwater Permit Comments
WA Department of Ecology
Water Quality Program
P.O. Box 47696
Olympia, WA 98504-7696

RE: Low Impact Development and Monitoring Preliminary Draft Permit Language

Dear Ms. Beale:

The Washington State Department of Transportation (WSDOT) appreciates the opportunity to respond to the Washington State Department of Ecology's solicitation for comments on the preliminary draft permit language and supporting documentation covering low impact development (LID) and monitoring requirements for the next permit cycle of the Municipal Stormwater General Permits. While WSDOT will not receive coverage under these permits, we see value in participating in the dialog as to how these future permit requirements might influence the development of the 2014 reissued WSDOT municipal stormwater permit.

Low Impact Development (LID)

We recognize that the preliminary draft LID language for western Washington puts forth an approach requiring the application of LID principles to the extent feasible for development and redevelopment at the site and subdivision scale. However, applying the proposed approach would be problematic in the highway environment. We encourage Ecology to consider pursuing an approach similar to what WSDOT already employs for highway settings.

WSDOT oriented its *Highway Runoff Manual* (HRM) to apply LID principles to the maximum extent feasible even prior to the Pollution Control Hearings Board's (PCHB) ruling on the matter. *Section 2-5.2* in the manual describes the stormwater facility design strategy which is accomplished through the following steps:

- **Step 1** Avoid and minimize impacts on hydrology and water quality.
- **Step 2** Compensate for altered hydrology and water quality by mimicking natural processes.
- **Step 3** Compensate for altered hydrology and water quality by using end-of-pipe solutions.

This section of the manual goes on to explain that:

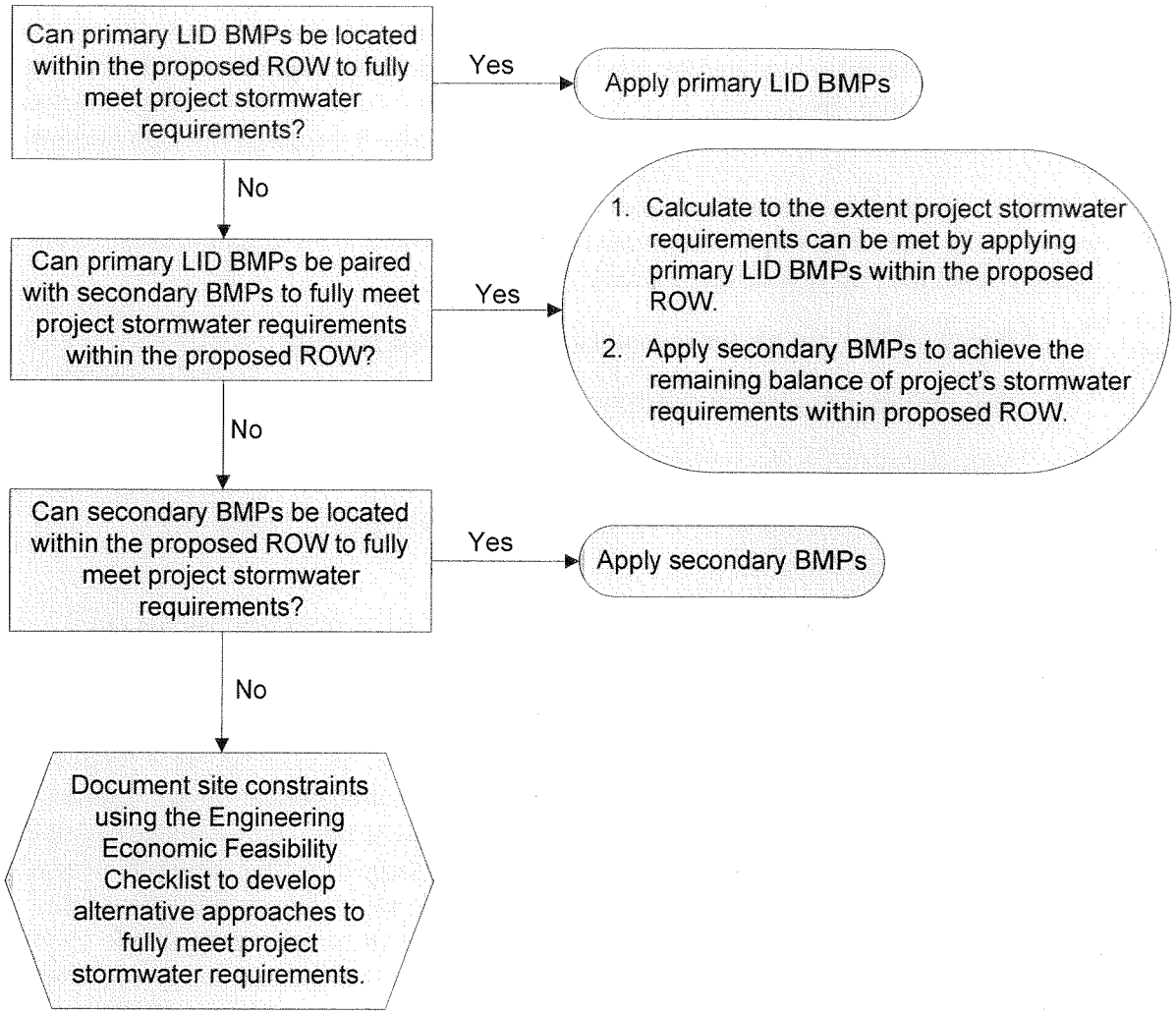
> *Steps 1 and 2 can be achieved by minimizing impervious cover; conserving or restoring natural areas; mimicking natural drainage patterns (for example, using sheet flow, dispersion, infiltration, or open channels); disconnecting drainage structures to avoid concentrating runoff; and using many small redundant facilities to treat, detain, and infiltrate stormwater. This approach to site design reduces reliance on the use of structural management techniques. Step 3 refers to the use of traditional engineering structural approaches (for example, detention ponds) to the extent that Steps 1 and 2 are not feasible.*
>
> *The methods listed for achieving Steps 1 and 2 above are commonly referred to as low impact development (LID) approaches. By using the project site's terrain, vegetation, and soil features to promote infiltration, the landscape can retain more of its natural hydrologic function. Low-impact development methods will not be feasible in all project settings, depending on the physical characteristics of the site, the adjacent development, and the availability and cost of additional right of way (if needed). However, the designer must always investigate the feasibility of using low-impact development methods. Low-impact development methods require understanding of soil characteristics, infiltration rates, water tables, native vegetation, and other site features. For this reason, it is important to gain the participation of design support services and others from the beginning through the end of the project development process.*

In addition, the HRM's best management practice (BMP) selection process (*Section 5-3*) guides designers through a procedure that favors LID techniques over other options. For instance, the BMP selection flow charts (*Figures 5.3.1* and *5.3.2*) direct designers to first consider the feasibility of natural and engineered dispersion and infiltration BMPs on a project. LID techniques are also incorporated in WSDOT's policy to minimize vegetation disturbance and to restore vegetation on disturbed areas in accordance with WSDOT's *Roadside Classification Plan*. Feasibility determinations occur using the HRM's *Engineering and Economic Feasibility* (EEF) *Evaluation Checklist*. This too provides a method to assist designers in determining and documenting when site-specific factors make constructing stormwater management facilities (LID or conventional end-of-pipe approaches) within or adjacent to the highway right of way infeasible.

WSDOT's HRM currently directs designers to use the HRM's LID approaches (i.e., dispersion, bioinfiltration pond/swale, bioretention soils, compost amended vegetative filter strips, media filter drain, and infiltration pond/trench) to meet project stormwater requirements. In situations where LID approaches can only partially meet project stormwater requirements, the process depicted in the flowchart below would guide designers to incorporate LID approaches to the maximize extent feasible.

WSDOT believes that the HRM's approach could also be successfully applied at the site and subdivision scale as a means of meeting the PCHB's directive to:

. . . require non-structural preventive actions and source reduction approaches, including Low Impact Development techniques (LID), to minimize the creation of impervious surfaces, and measures to minimize the disturbance of soils and vegetation where feasible."



Primary BMPs = Dispersion, bioinfiltration pond/swale, bioretention soils, compost-amended vegetative filter strips, media filter drain, and infiltration pond/trench.

Secondary BMPs = All the remaining HRM "non-primary BMPs.

Appendix 1– Minimum Technical Requirements for New and Redevelopment

We have a significant concern regarding the propose changes in *Appendix 1*. In our view, these changes do not represent low impact development principles. A key concern with these changes is the LID performance standard itself. The standard does not represent "low impact" in that it:

- Results in infiltrating more runoff than would occur under pre-European conditions since rainfall runoff normally captured by the forest canopy and/or evapotranspired would be instead directed into the ground. In some circumstances, rainwater harvesting could be employed to mimic these aspects, but has not been proposed as one of the LID options.
- Fails to recognize that in most instances the receiving underground hydrology is as altered as the receiving waters this standard aims to protect. This situation is particularly acute in developed urbanized areas where:
    - Past development has destroyed soil structure and porosity
    - Soil infiltration rates are usually very low
    - Infiltration and recharge increases risk to foundations and infrastructure
    - We often do not know what exists under the ground (e.g., rubble fill, contaminated soils, etc.)
- Works at cross-purposes with smart growth principles by creating new barriers to fostering redevelopment, thereby incentivizing development at the urban fringe and in Greenfields.

Introducing this new standard would have significant implications. In assessing this proposal, has the *Western Washington Hydrology Model* (WWHM) has been calibrated to accommodate this proposed standard? For example, has Ecology run simulations on a representative 10,000 square foot parcel with typical development to figure out how large of a LID facility is needed to meet the proposed LID standard for feasibility? Unfortunately, we could not fully assess the potential implications as *MGSFlood* is not capable of evaluating the proposed standard. However, using the single-event model for a worst-case scenario (i.e., the discharge was from an orifice and infiltration is not possible) resulted in detention volumes over 4 times of current flow control design standards.

On page 34 of Appendix 1, Ecology solicited comments on the minimum initial saturated hydraulic conductivity of native soils for bioretention or rain garden use. WSDOT recommends that Ecology run simulations using *MGSFlood* or *WWHM3* using various underlying soils saturated hydraulic conductivity amounts (0.15 inch/hour to 1 inch/hour) to see how large a bioretention BMP would be needed for a 10,000 square foot development. WSDOT did the following model run using *MGSFlood* for purposes of assessing feasibility:

A 10,000 square foot parcel developed to 60% impervious, 40% grass with a development with a mean annual precipitation of MAP 48 inches. The bioretention area has 18 inches of treatment soil with a storage depth of 3 feet. It was assumed that the bioretention area was higher than the seasonal high ground water table so as to not have an effect on the design. The model run generated the following results:

Underlying infiltration rate	*Bioretention Footprint*
0.15 inches/hour	*2,704 square feet (52' x 52')*
0.5 inches/hour	*1,681 square feet (41' x 41')*
1.0 inched/hour	*1,369 square feet (37' x 37')*

For a 10,000 square foot parcel, using a 0.15 inch/hour underlying soils infiltration rate, the stormwater facility would take up about 27% of the parcel area. We estimate using the 0.5 inch/hour and 1.0 inch/hour rates would take up between 13% – 16% of the parcel area. Base on our analysis, we recommend setting the minimum initial saturated hydraulic conductivity at ≥0.5 inches/hour.

The PCHB ruling did not suggest that defining such a performance standard was necessary. Given the major implication described above (e.g., feasibility, unintended environmental consequences associated with installing stormwater facilities, and costs), we don't see adequate information presented to support introducing this new performance standard.

The *mandatory list* of BMPs fails to recognize that many LID approaches developed for suburban settings do not work in cities. As infiltration rates decrease, facility failures increase dramatically. Also, many questions arise with the mandatory application of pervious pavement. For example, how does one:

- Repair/patch pervious pavements and any associated damage to the subgrade or subsurface coursework necessary to maintain the integrity of the roadway?
- Deal with spills?
- Make the case for using products with significantly shorter pavement life (i.e., higher lifecycle replacement costs and increased frequency of pavement replacement-induced traffic disruptions)?
- Meet the challenge of the exponential growth in onsite inspections needed to ensure that BMPs located on private property are functioning as designed so as not to impose a burden/liability to municipal systems?

In 2010 the State Legislature directed WSDOT to "*work with the Department of Ecology (ECY), the County Road Administration Board (CRAB), and the Transportation Improvement Board (TIB) to explore and explain the potential use of permeable asphalt and concrete pavement in state highway construction as an alternative method of storm water mitigation and the potential effects on highway pavement replacement needs.*" This effort generated a report documenting

the findings of a search of the available literature concerning the use of permeable pavement (see *Section 9* and *Appendix D* of the attached report). However, work remains to explore the feasibility of collecting stormwater runoff and redistributing it for infiltration below impervious pavements.

The approach proposed in the preliminary draft language for *Appendix 1* introduces new terminology and an additional level of complexity to an existing framework considered by many to be overly confusing and cumbersome to apply. For example:

- The definition of *receiving waters* was expanded to include groundwater. This raises questions as to whether Ecology intended this concept to extend to the permit's S4.F compliance language. Would the soils receiving the infiltrated runoff be considered part of the receiving waters? WSDOT recommends removing "*groundwater to which surface runoff is directed by infiltration*" from *receiving waters* definition.

- The preliminary draft permit language uses the phrase "*to maximum extent practicable*" when draft language in *Appendix 1* uses the phrase "*maximum extent feasible*" to describe LID requirements. To reflect the PCHB's ruling, we recommend using "*maximum extent feasible*" in references to LID requirements.

- WSDOT would find integrating new proposed Construction Stormwater Pollution Prevention Plan element, *Protect Low Impact Development BMPs* (*Appendix 1*, page, 19), into the existing HRM easier and less confusing if it could be included as requirement #13 rather than #12, leaving the existing numerical reference to "*12. Manage the Project*" untouched.

- *Appendix 1* (page 21) requires projects that only trigger *Minimum Requirements 1-5* to use LID BMPs for the project's *new* and *replaced hard surfaces*. For paver projects, which may have a significant amount of *replaced hard surfaces* (e.g., concrete panel replacements) but little *new hard surfaces*, this new obligation would represent a significant economic hardship. WSDOT recommends projects that trigger *Minimum Requirements 1-5* only be required to use LID BMPs to address the project's *new hard surfaces* to the maximum extent feasible. Due to the types of road projects subject to *Minimum Requirements 1-5*, WSDOT recommends including a feasibility consideration for cost as BMP design, placement, conveyance infrastructure, and right-of-way could easily drive the cost of these types of projects to the point of infeasibility.
- *Appendix 1* introduces the terms *pollution generating hard surface* (page 23), *effective hard surfaces* (page 28), and *effective pervious surfaces* (page 28) without defining them.
- The definition of *LID Best Management Practices* (page 4) includes the mention of bioretention/rain gardens, permeable pavements, roof downspout controls, dispersion, soil quality and depth, minimal excavation foundations, vegetated roofs, and water re-use. WSDOT recommends expanding this list to include the following Ecology-approved HRM BMPs: natural and engineered dispersion, compost amended vegetated filter strip, bioinfiltration pond, bioinfiltration swale, infiltration pond, infiltration trench, and media filter drains.

- For long and linear road and highway projects, WSDOT often utilizes the HRM's *equivalent area option*. We would recommends allowing use of *equivalent area trading* between *threshold discharge areas* (TDAs) to meet any new LID requirements.

Monitoring

While the preliminary draft monitoring language does not explicitly propose a role for WSDOT, we want to share our vision of how we can most effectively participate in the regional monitoring framework.

Program Effectiveness Monitoring

Of the three legs of the proposed monitoring framework, WSDOT considers program effectiveness monitoring the most valuable element as it provides a feedback loop to refine the effectiveness of a permittee's stormwater management program. WSDOT can fulfill a very important niche by focusing our primary monitoring role on evaluating the effectiveness of programs geared to major roads and highways. Taking on this role would support other regional program effectiveness evaluative efforts and allow others to concentrate on other regional priority studies. WSDOT has demonstrated its ability to successfully carryout stormwater-related roadway research of regional and statewide significance. Notable examples of innovations emerging from our efforts include the development and evaluation of the media filter drain and our more recent investigation into linear soil amendment approaches. WSDOT recommends that our BMP and program effectiveness program constitute our contribution to the regional effectiveness monitoring program as it would provide benefits to city and county road departments across the state.

Source Identification and Diagnostic Monitoring

WSDOT also considers source identification and diagnostic monitoring an important part of its monitoring framework. As written, the preliminary draft language fails to contain sufficient detail on the regional-scale analyses envisioned as part of this undertaking. Unlike other municipal permittees, WSDOT's permit allows TMDL obligations to accrue beyond Phase 1 and 2 boundaries. As a result, WSDOT finds itself amassing an ever growing number of TMDL-related obligations that involve source identification and/or diagnostic monitoring. Given the magnitude of these commitments relative to other permittees, meeting these large-scale requirements should relieve us of any further obligation to contribute funding to regional source identification and diagnostic monitoring efforts.

Status and Trend Monitoring

While WSDOT recognizes the value in conducting receiving water status and trends monitoring, we question the appropriateness of making this a municipal stormwater permit obligation. Certainly, answering questions as to whether conditions in receiving waters are improving or deteriorating as a result of municipal stormwater discharges and stormwater programs would be worthy. However, the multiple stressors that exist beyond municipal stormwater discharges makes it extremely difficult to develop a study design capable of ferreting out any stormwater-related *cause and effect signal* in the receiving water. As proposed, the municipal permittee funding obligation for this type of monitoring is not proportional relative to its value in

generating the type of actionable information needed to direct adaptive management of our stormwater management programs.

However, we recognize that local municipalities may have other interests in receiving water status and trends monitoring and thus may consider the municipal stormwater permit a useful mechanism in achieving those objectives. Given the fiscally constrained environment we find ourselves operating in, the elements of the monitoring framework needs to be "right-sized" so as not to risk draining resources from stormwater management programs that we know provide direct benefit to improving receiving water quality. Instead of solely placing this obligation on municipal stormwater permittees, a fairer approach would be to also require non-municipal entities (i.e., industrial, commercial, agricultural, forestry, mining, etc.) to contribute to regional status and trends monitoring efforts.

Governance and Administration of the Regional Program

WSDOT recognizes the importance of employing regionally consistent methods to collect, store, and analyze comparable and valid data. Developing this foundation is critical to any monitoring program's credibility and success. These activities should be reflected in the funding agreement between Ecology and municipal stormwater permittees. The permits' compliance timelines should reflect the lead time necessary to develop this foundation in advance of deploying data collection efforts.

Regarding the funding agreement, the "*Statement of Work*" should also include ongoing contract management and oversight with the entities contracted to perform the scope of work. As administer of the funds and program, Ecology oversight needs to go well beyond its "*participation in an oversight committee.*" While we welcome Ecology's convening of a committee to support these oversight functions, relinquishing these responsibilities entirely to a committee (most likely made up of volunteers) falls short of our expectations given the scope and magnitude of the program. As program administrator, we would expect Ecology to assume lead responsibly for fiscal oversight, field and data audits, and review of deliverables to ensure that the regional monitoring program's expectations are met. Agreement language relieving Ecology of all responsibilities for cost overruns does not instill a great deal of confidence in holding parties (i.e., Ecology or its contractors) accountable for the program's deliverables.

The permit language itself would benefit from providing additional clarity as to the extent of the permittee's obligations for regional monitoring efforts. The explanatory notes state that:

> *The proposed approach removes specific monitoring requirements from the permit and relieves individual permittees of the obligation to conduct Special Condition S8 monitoring activities.*

This is consistent with Ecology's staff explanations given at meetings where "writing the check, constitutes compliances." With this arrangement, adding clarity to the existing permit language contained in S3.B is necessary to explicitly state that this provision is not applicable to the contractual monitoring funding agreement between Ecology and the permittees. Without such language, a third party may conclude that the permittee can be held in non-compliance if Ecology or its contractors fail to deliver on their regional monitoring program obligations.

In closing, I want to reiterate WSDOT's commitment to ensuring our transportation facilities support clean water. I hope that the feedback provided above is helpful in your deliberations in developing the next round of municipal stormwater permits. Should you have any questions about these comments, please do not hesitate to contact Larry Schaffner, NPDES Municipal Stormwater Permit Coordinator at (360) 570-6657.

Sincerely,

Megan White, P.E., Director
Environmental Services Office

MG:da

cc: Ken Stone, ESO Resource Programs Branch Manager
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